ON THE NEED FOR VALIDATING THE NAME " STENTOR " OKEN, 1815 (CLASS CILIOPHORA) FOR USE IN ITS ACCUSTOMED SENSE

By HAROLD KIRBY
(*University of California, Berkeley, California, U.S.A.*)

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Several species of well-known ciliates have for more than a century usually been placed in the genus *Stentor*, and because of the particular value of these ciliates for research and in class instruction, as well as the frequency with which they come to the attention of microscopists, there is a large literature under the name *Stentor*. The name has not yet been placed in the *Official List of Generic Names in Zoology*. Examination of the nomenclatural status of the genus has shown that several points of confusion, hitherto usually ignored, must be cleared up. The name for the genus and its type species should be decisively established as soon as possible by appropriate action by the International Commission on Zoological Nomenclature.

The first record of observation of ciliates now included in *Stentor* was read by Abraham Trembley to the Royal Society of London in 1744 and was published in 1745 in the *Philosophical Transactions*, **43** : 180 ff. He reported having seen in fresh water animalcula which De Réaumur judged to belong to the general class of Polypi. Part of the paper is devoted to an account of clustering Polypi, which Trembley stated were named by De Réaumur " les Polypes en bouquet " ; these were colonial vorticellids, probably *Zoothamnium*. Trembley also wrote of small Polypi of a different sort from those that are found in clusters, which De Réaumur thought proper to distinguish by the name of Tunnel-like Polypi. He gave a sufficiently informative account of these animalcula and their manner of division so that it is evident that he dealt with *Stentor*. He reported being acquainted with three species of these Polypi, which are respectively green, blue, and white.

In *Employment for the Microscope* (1753, pp. 330-334) Henry Baker wrote of Funnel-Animals which he found attached to a parcel of snail's eggs, and he quoted Trembley's account, stating in a footnote that he was pleased to find that de Réaumur and Trembley had ideas of the creature so nearly like his own. He gave a figure (pl. 13, fig. 1) which evidently depicts a species of the genus known later as *Stentor*, though he supplied no sufficient information by means of which one could identify it with *St. polymorphus*, as did Ehrenberg (1838. *Infusionsth.* : 263).

Figures of an organism of this group were published in 1755 by Rosel von Rosenhof (*Insectenbelust.*, **3** : pl. 94, figs. 7, 8) who discussed it in the text (: 585) under the name " der schallemeynähnliche Affterpolyp." The figures represent one of the colorless species, which Ehrenberg (1838. *Infusionsth.* : 262) considered to be the one that he later named *St. mülleri* : but the species represented by Rösel cannot actually be identified.

The scientific name first given to a ciliate that now belongs to the genus *Stentor* was *Hydra stentoria* Linnaeus (1758, *Syst. Nat.* (ed. 10) **1** : 817). The name was applied to the representation of the organism by Rösel. Under the name, Linnaeus referred to four of Rösel's figures (*Insectenbel.*, **3** : pl. 94, figs. 5, 6, 7, 8). Figures 5 and 6 depict a rotifer ; Ehrenberg (1838, *Infusionsth.* : 404) included a reference to them in the synonymy of *Lacinularis socialis*. Thus the name given by Linnaeus in 1758 was applied both to a rotifer and the ciliate.

Linnaeus later (1767, *Syst. Nat.* (ed. 12) **1** : 1321) published an emendation of the specific name as *stentorea*, and under *H. stentorea* referred to an extended list of references : the accounts by Trembley and Baker and the latter's figure which I have mentioned : Rösel's figs. 7 and 8 (not 5 and 6) ; references by Ledermuller and by Pallas. Linnaeus (1767) referred to Rösel's figures 5 and 6 under *Hydra socialis*. He had evidently restricted his concept of *H. stentorea* so far as the original reference of 1758 was concerned, to Rösel's figures that actually represented the ciliate. Pallas (1766) used the name *Brachionus stentoreus*, with varieties *alba*, *viridis*, and *caeruleus* : he removed the stentorid of Linnaeus to that genus, along with some rotifers and vorticellids.

O. F. Müller, recognising that the ciliate dealt with by Linnaeus could not be put in the genera *Hydra* or *Brachionus*, included it in *Vorticella*. Under *Vorticella stentorea* (1773, *Verm. terrest. fluviat.* : 111), he quoted the description of *Hydra stentorea* by Linnaeus. In the genus he also treated of several species that were in Linnaeus's genus *Vorticella*, together with a heterogeneous assemblage of ciliates and some rotifers. In this work Müller dealt with two other stentorid ciliates, which he named *Vorticella nigra* (*op. cit.* : 96) and *V. polymorpha* (*op. cit.* : 98). Later (1786, *Animalc. Inf.* : 262) he described a third species, *Vorticella multiformis*. A peritrich dealt with in the latter work is *Vorticella versatilis* (*op. cit.* : 281, pl. 39, figs. 14-17). In that peritrich individuals occur abundantly in the periphery of large, gelatinous masses.

Vorticella stentorea was included in the genus *Linza* Schrank, 1802, by Schrank (1802, 1803). This genus contained the colonial peritrich, then widely known as *Ulva pruniformis*, which was Müller's *Vorticella versatilis*, and of which the currently used name is *Ophrydium versatile* ; Müller's *Vorticella flosculosa* (1786, *Animalc. Inf.* : 304, pl. 43, figs. 16-20), which is the colonial rotifer known later as *Lacinularia socialis* : and Müller's *Vorticella socialis* (*op. cit.* : 304, pl. 43, figs. 13-15), which is in part also *Lacinularia socialis*. Schrank's genus *Linza* was a complex of a peritrich, a rotifer, and a stentorid ciliate. Neave (*Nomenclator Zoologicus*) lists *Linza* as in Rotifera.

The stentorids that had been named by Müller (1786) *Vorticella nigra* and *V. polymorpha* were placed by Schrank (1803) in the genus *Ecclissa*, as *E. nigra* and *E. viridis*, along with various species of Müller's *Vorticella*.

Bütschli (1889 in Bronn, *Klass. Ord. Thierreiches*, **1** : 1728) listed *Ecclissa* and *Linza* pp. Schrank in the synonymy of *Stentor*. Stein (1876, *Organ. Inf. fusionsth.* : 221) had written of the injustice of the neglect suffered by Schrank's names, but recognised the futility of attempting to revive one or the other of

them for the stentorid ciliates. The history of those names is complicated and obscure, and they have never come into use. To complicate the matter still further, I find that Lamouroux *et. al.* (1824, *Hist. nat. Zooph.*, **2** : 291) refer to the genus *Ecclissa* established by Ocken (*sic*) for vorticellids, and to *Linze*, a genus established by Guettard in sponges. Also there is *Eclissa* Modeer (*A.*), 1790, emended in Agassiz (1842-46, *Nomenclator Zoologicus*) to *Ecclissa* Modeer, in Vorticellina.

These names are associated with the older history of the nomenclature of stentorid ciliates, and so have been discussed, but they are not necessarily important in relation to the present problem. The type of *Linza* Schrank may be considered to be *Vorticella flosculosa* Müller, which is the rotifer *Lacinularia socialis* ; and that of *Ecclissa* Schrank may be considered to be one of the peritrichs he included in it. Thus these problems are removed to other groups than that which now concerns us, though it would be well if the Commission used its Plenary Powers to suppress the names *Linza* Schrank and *Ecclissa* Schrank, as well as *Eclissa* Modeer.

Oken (1815, *Lehrb. Naturgesch.*, Theil **3**, Abt. 1 : 45) applied the name *Stentor* to the same group of organisms as that in Schrank's genus *Linza*, though he did not refer to that fact. In the genus he gave three species : *St. solitarius* Oken, 1815 (*Vorticella stentorea* renamed) ; *St. socialis*, which was the rotifer *Lacinularia socialis* ; and *St. pruniformis* otherwise known as *Ulva pruniformis* or *Linza pruniformis* (*Ophrydium versatile*). Oken (1815) also listed the genus *Ecclissa*, with *E. nigra* (*Vorticella nigra*) and *E. viridis* (*Vorticella viridis*) as the species. Oken had distributed the species within the group we now know as *Stentor* into two genera, *Ecclissa* in his listing containing only members of that group, *Stentor* containing a heterogeneous assemblage of organisms, one of which belonged to the group in which we are presently interested.

The name *Stentor* Oken, 1815, was preoccupied. Geoffroy Saint-Hilaire (1812, *Ann. Mus. Nat. Hist.* **19** : 107) had proposed the name *Stentor* for a genus of South American monkeys, listing six species. For that group of howling monkeys, however, two generic names had already been supplied. *Stentor* Geoffroy Saint-Hilaire, 1812, is antedated by *Alouatta* Lacépède, 1799, and by *Mycetes* Illiger, 1811 (Palmer, 1904, *Index generum mammalium, North Am. Fauna*, No. 23). Consequently, *Stentor* has never been in use among mammalogists, and is often neglected even as a synonym.

A comparable case is that of *Necator* Stiles, 1903, which was dealt with by the International Commission on Zoological Nomenclature at the 7th Meeting in Paris, July, 1948 (*Off. Record Proceedings* : 301-302)[1]. It was found by Mr. Hemming that the above generic name is a junior homonym of *Necator* Sclater and Saunders, 1896, an emendation of *Nicator*, Finsch and Hartlaub, 1870, a genus in the Class Aves. *Necator* has not been in use by ornithologists, *Nicator* having always been the name by which the genus is known. At this meeting, the Commission used its Plenary Powers to suppress *Necator* Sclater and Saunders, 1896, and to validate the generic name *Necator* Stiles, 1903.

[1]See *Opinion* 201 (1954, *Ops. Decls. int. Comm. zool. Nomencl.* 3 : 267-274).

Another aspect of this problem is its relation to a matter that came to the attention of the International Commission on Zoological Nomenclature at its 13th Meeting in Paris, July, 1948 (*Off. Record Proceedings* : 365-366). It concerned a proposal that had been made by Stiles for addition to the *Official List of Generic Names* of three genera of Carnivora first published by Oken (1815-16) in his *Lehrbuch der Naturgeschichte*, and an application by Osgood for a ruling on the question of availability of names first published in Oken's *Lehrbuch*. The Commission agreed to take into consideration as soon as possible the question of a ruling on the availability of Oken's names, and to defer a decision on the application by Stiles for addition of three of Oken's genera of Carnivora to the *Official List* until there had been a decision on the availability of those names.

Since *Stentor* Oken, 1915, is a name also published in the *Lehrbuch* in question, its placement in the *Official List of Generic Names* is subject to the same consideration.

Several other names have been proposed for the ciliates of this generic group. Bory (1824, Lamouroux, Bory de Saint-Vincent, et Eud. Deslongchamps, *Enc. méth., Hist. nat. Zooph.*, **2** : 533, 697) gave the name *Stentorina* to a genus which included the stentorids which Müller had grouped in *Vorticella : V. polymorpha*, *V. nigra*, and *V. multiformis*. This was the first bringing together of these species into a single independent genus. Bory's concept of their relationship was obviously far superior to that of Oken. Bory did, however, carry on an error that others had made before him, in giving the names *Stentorina Roëselii* and *S. biloba* to a rotifer, the one later known as *Lacinularia socialis*.

The generic name *Tubaria* was proposed by Thienemann (1828, *Lehrbuch Zool.* : 12), since the name *Stentor* had been used for a genus of apes by Geoffroy. He gave the species name *T. viridis*, which according to Ehrenberg (1838) is *Stentor polymorphus*. I have not been able to refer to Thienemann's book, but the name has no significance for the present nomenclatural problem.

Reichenbach (1828, *Zoologie* in *Allg. Taschenb. Naturw.*, Th. **5**, 1 : 95) substituted the name *Stentorella* for *Stentor* Ok. *non* Geoffr. He did not refer to any species. This name was neglected for more than a century, not even being included in nomenclatural indices (Agassiz, 1842-6 : Sherborn, 1902). Recently Bhatia (1936, *Fauna Br. Ind., Prot : Ciliophora :* 234) noted preoccupation of *Stentor* for a genus of Mammalia and adopted instead *Stentorella* Reichenbach. Bhatia neglected the prior claim of *Stentorina*, if substitution is to be made, and his proposal to use *Stentorella* is invalid.

Another problem exists in regard to identification of the type species of *Stentor* Oken, 1815. When proposed, it contained only the one heterotrich *St. solitarius* Oken, 1815, along with the peritrich and rotifer. *St. solitarius* is a name supplied as equivalent to *Vorticella stentorea* Müller, 1773, so stated by Oken. It is also equivalent to *Hydra stentoria* Linnaeus, 1758. The trail of references occurring in the different authors' works goes back to Linnaeus,

But the same or equivalent names were not necessarily applied to the same organisms, and species identification of the ciliates as named and described by these authors is not possible.

Ehrenberg (1832, *Abh. Akad. Wiss. Berlin*, **1831** : 99) substituted the name *Stentor mülleri* E. for *Vorticella stentorea* Müller. A recognisable figure of *Stentor mülleri* was published by Ehrenberg (1837, *op. cit.* **1835** : pl. 1, fig. 16). A full, illustrated account of the species was provided by Ehrenberg (1838. *Infusionsth.* : 262). In that work Ehrenberg listed *Stentorina mülleri* Bory de Saint-Vincent, 1824 in the synonymy of *Stentor mülleri*. I have been unable to find that Bory used that name, though he did give *Stentorina stentorea* for Müller's *Vorticella stentorea*, a fact that Ehrenberg did not refer to in the synonymy in discussion.

Ehrenberg (1832, *op. cit.* : 99) stated that *Stentor mülleri* was *Vorticella stentorea* Müller, and in 1838 he listed *St. solitarius* Oken in the synonymy of *St. mülleri*. *St. solitarius* is the type, being the only ciliate in Oken's genus *Stentor* at the time it was proposed. Prior to Ehrenberg's accounts of 1832, 1837, and especially 1838 it is impossible to tell what species of colourless stentorids are referred to by the names that were given. The description of *Stentor mülleri* by Ehrenberg can, as Mr. Hemming suggested, be designated by the Commission as that to be accepted for the nominal type species of *Stentor* Oken, 1815. Since 1830 the specific names of this nominal species, *solitarium* Oken or the older *stentoria* or *stentorea*, have not been in use. It would be undesirable to revive them. The Commission should consider suppressing those specific names and designating the type species of *Stentor* as *St. mülleri* Ehrenberg, 1832 (*Abh. Konig Ak. Wiss. Berlin*, **1831** : 99).

There is not complete agreement about the taxonomic status of *Stentor mülleri*. Stein (1867, *Org. Infusionsth.* Abt. **2** : 223, 229) maintained that *St. mülleri* is no more than a colourless form of *St. polymorphus* (*i.e.*, without zoochlorellæ), and placed (: 247) *Hydra stentorea* L., 1758 ; *Vorticella stentorea* Müller, 1773 ; *Stentor solitarius* Oken, 1815 ; and *Stentorina stentorea* Bory, 1824 in the synonymy of *Stentor Roëselii* Ehrbg. This species like *St. mülleri* is colourless and may occur in a gelatinous lorica. *Stentor mülleri* is recognised, however, in recent literature in protozoology.

In his list of proposed *Nomina Conservanda* Apstein (1915, *Sitzungsber. Gesell. Naturf. Freunde Berlin* **1915** : 123) included *Stentor* Oken, 1815, and gave as the representative species (" eine art gennant, für welche die Gattung erhalten bleiben soll ") *polymorphus* Müll., 1773. However, under Article 30, that species is excluded as the type species of *Stentor*, since it was not included under the generic name at the time of publication.

The International Commission on Zoological Nomenclature is faced with a problem in considering the placing of the name of this important ciliate genus on the *Official List of Generic Names*. If it is decided that new names in Oken's *Lehrbuch* are available, *Stentor* Oken, 1815, may be preserved by suppression of *Stentor* Geoffroy Saint-Hilaire, 1812. If it is decided that the new names in

Oken's *Lehrbuch* are not available, the problem of selecting a name for these ciliates must be considered further. Perhaps *Stentorina* Bory de Saint-Vincent, 1824, could be adopted, with the type species *Vorticella polymorpha* Müller, 1773. A change of so well-known and long used a generic name as *Stentor* should be avoided if possible.

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REPORT ON THE STATUS OF THE GENERIC NAME "STENTOR" OKEN, 1815 (CLASS CILIOPHORA, SUBCLASS CILIATA)

By FRANCIS HEMMING, C.M.G., C.B.E.

(*Secretary to the International Commission on Zoological Nomenclature*)

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In correspondence relating to the name *Entamoeba* Casagrandi and Barbagallo, 1895, Professor Harold Kirby (University of California, Berkeley, Cal., U.S.A.) drew my attention to the fact that the name universally applied to the well-known genus of Ciliates known as *Stentor* was invalid and suggested that the problems involved should be studied by the International Commission on Zoological Nomenclature as a preliminary to name *Stentor* Oken, 1815, being placed on the *Official List of Generic Names in Zoology.* I at once asked Professor Kirby to prepare a statement of the case for con-